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PAPERS
IN
CHEMISTRY.

FIFTY GUINEAS, *the Premium offered in Class 93, were this Session adjudged to Mr. WILLIAM SMITH, for a valuable six-sheet Mineralogical Map of England and Wales. The following Communication was received from him, and the Map preserved in the Society's Repository, along with a printed Explanation of the particulars of the Map.*

SIR,

I BEG leave to lay before the Society of Arts, &c. my mineralogical map of England and Wales. It is on a scale double the size of that required by the Society in their premium offered. I hope, on an investigation of its merits, it will entitle me to the premium and patronage of the Society. It has met with the approbation of many noblemen and scientific characters, who have examined it during its execution.

I remain, Sir,
Your obedient servant,

WILLIAM SMITH.

No. 15, Buckingham-street, Feb. 8, 1815.

To C. TAYLOR, M. D. SEC.

CERTIFICATES.

CERTIFICATES.

SIR,

I AM happy to hear from Mr. Smith, that his map is completed, and exhibited to the Society of Arts. Proof sheets of the greater part of it have lain with me six months past; and from a minute inspection of the western counties, with which I am conversant, I can certify its accuracy; and from my personal intimacy with Mr. Smith, I cannot doubt the correctness of those parts which have not yet been submitted to my view. I consider the map, in a national view, as the most important work that ever was given to the public.

I am, Sir,

Most respectfully yours,

BENJAMIN RICHARDSON,
Rector of Farley.

Farley Castle, near Bath, Feb. 23, 1815.

To C. TAYLOR, M. D. SEC.

SIR,

I AM happy to find that the Society of Arts, &c. have turned their attention to a geological survey of England, and that the map of Mr. William Smith is now before them. In the preface to my geological work, entitled "The Character of Moses established for Veracity, as an Historian recording Events from the Creation to the Deluge," I have fully expressed my opinion of the super-eminent ability and knowledge of this artist.

About

About ten or twelve years since, he permitted me to attend him in all his researches, for six months, round Bath, and I have the satisfaction of bearing testimony to his accuracy of observation. I have carefully examined his map, and in every part of England with which I am acquainted, I find his map perfectly agree with my own observations. The utility of his map is great—it is, indeed, inestimable. This I have displayed at large in the work to which I refer. In publishing his discoveries, he has conferred an obligation on his country, which calls for a suitable return, and I am persuaded that his claim will not be disregarded.

I remain, Sir,

Your obedient humble servant,

JOSEPH TOWNSEND,
Rector of Pusey.

8, Francis street, London, May 10, 1815.

To C. TAYLOR, M.D. Sec.

Mr. SMITH's *Observations on his Map.*

As the laudable object of the Society for the encouragement of Arts, Manufactures, and Commerce, is to reward the industrious, and to call forth those energies of the mind, which have furnished humanity with every thing that is great and good, I may be allowed to enumerate in your pages some of the benefits resulting from that knowledge of the strata, which led me to the completion of the great work for which I have just received the honorary reward.

The

The Society very wisely foresaw, in offering such a premium, that one of the greatest difficulties in understanding such an extensive branch of Natural History arises from a want of some method of generalising the information, which could not be supplied otherwise than by a map, which in one point of view gives the locality of thousands of specimens.

It will be seen, that the island of Britain abounds with a great variety of substrata, which are the cause of as great a variety of soil. Their successive outlines, represented by the coloured lines in the map, occasion considerable undulation of surface, and a great variety of hill and vale, the outlines of which form the natural divisions in the country, which gave rise to the district names in the map.

The wisdom of Providence is thus beautifully displayed in such an extraordinary arrangement of the materials of the earth, by which water is abundantly produced in some parts; building stone, coal, and iron stone, and a thousand other of its valuable products, in others; and all successively raised to elevated ground for man's convenience and easy attainment.

It is the object of this map, and of the works which will follow it, to place those natural advantages in their clearest light, for the benefit of society, and that the labours of those employed in obtaining them may not be misapplied.

The uses of such a discovery of regularity in the courses and order of the strata, and the facility of tracing them by means of their imbedded organic remains, are numerous, and require only to be named to persons of judgment and discrimination, to prove their value.

What can be of greater importance in human affairs,
than

than a complete knowledge of the soil, which man is under a divine injunction to cultivate and replenish, that he may derive from that labour his daily subsistence?

On this particular province depends not only the acquisition of his own comforts and conveniences, but those of all creatures which have been subjected to his will—hence, surely, too much thought, as well as labour, cannot be bestowed upon the subject.

The culture of land is a primary and honorable occupation of life; and all owners and occupiers of the soil should know the means of increasing and improving its produce, as a property in which the public at large, as well as themselves, are most materially interested.

The wonderful admixture of soils, marls, minerals, and fossil shells, are deposited in the earth for a variety of purposes, many of which are doubtless still unknown; but the present discovery of regularity in the strata, to which fossil shells are now become the Indices, may enable the farmer to choose lands most congenial to his wishes, and usual system of management, and serve also to divide and appropriate the great varieties of soil to different purposes, according to the properties and effects of each stratum.

He will thus know where to search for marl or limestone for manure, where to improve by draining or floating, and how to arrange his operations, so as to render them intelligible to others who may be desirous to try similar experiments on soils of the same strata.

The geologist and philosopher will derive an inexhaustible fund of information from such a methodical arrangement of strata, in which the innumerable fossilized organic remains are imbedded. These mysterious productions, long collected and preserved in the cabinets of the

the curious, will become doubly interesting to their possessors and collectors, in the easy and pleasant clues they afford to the knowledge of the strata.

Such simple methods of acquiring useful and important information, may lead to a better knowledge of the various beds of coal and ironstone—the improvement of some of those works, and the extension of others ; and it will undoubtedly deter many from the imprudent expenditure of large sums of money in searching for these valuable substances out of the regular course of their strata, where there can be no hopes of finding them.

Ascertaining also, that the metallic veins are confined to a particular part of the country, and found not only in particular strata, but in certain fissures of those strata, may check the delusive mining projects into which many have been too incautiously led—extend the just notions of the practical miner, and excite his curiosity to new and unthought-of discoveries.

The various artists employed in building, from the humble brick-maker to the enlightened architect, are all interested in a method of discovering sand, clay, stone, slate, and other materials, and of selecting with certainty such as are best.

Fullers, founders, glass-makers, and potters, will learn where to obtain earths, sands, and clays, of the qualities best suited to their respective purposes, and sources of supply will probably be opened in plans of which they now entertain no idea.

Chemists, colourmen, vitriol, alum, and salt-makers, will learn how to trace the materials they have occasion for, and will be enabled frequently to obtain at once the different advantages of more convenient situations, smaller expense, and an improved quality.

The

The canal engineer will be better enabled to choose water-tight strata—to find them most appropriate materials—avoid slippery ground or to remedy the evil—better supplies of water will be obtained for canals, and more of the heavy articles of tonnage, which alone can render them profitable, will be obtained from the strata, intersected or contiguous, or from new subterraneous supplies, which may be opened.

The contractor for such works may, from the same abundant sources of information, form his estimates with more certainty to himself, and more satisfaction to his employers.

A better knowledge of the sites and qualities of the different road materials is now become an object of national importance, and hence the necessity of showing the canals, on a map of the strata, by which any improved supply of these heavy articles may be readily ascertained.

The materials for the construction of ponds, reservoirs, and water for their supply, depend also on a knowledge of the strata; and the superior skill of some workmen employed in their construction, arises from a practical acquirement of such knowledge which they cannot explain.

The quackery of finding water by the divining rod, or other equally inexplicable mysteries, is completely done away, by a method of tracing the strata which produce the springs; and thus the important art of draining land, and of finding water for dwelling houses, is now reduced to a science dependant on a knowledge of the strata. It was upon this principle the author proceeded, in the important improvements he established for Mr. Coke, the Duke of Bedford, and others, in first draining, and then

irrigating their boggy land. The author, though not yet very beneficially employed for himself, has had the satisfaction of seeing thousands of acres drained and variously improved under his direction, on the principles established by the discoveries which will now be speedily published, to accompany the map of strata, and he trusts to a generous public for his reward.

WILLIAM SMITH.

No. 15, *Buckingham-street, York Buildings,*
June 7, 1815.

To C. TAYLOR, M. D. SEC.

Explanation of Mr. WILLIAM SMITH's Map of the Strata.

THE courses of the strata, or the length and breadth of surface occupied by each, as they rise successively from the level of the sea, on the eastern to the western side of the Island, are represented by colours.

The edges of the strata, which may all be crossed in a journey from east to west, are called their out crops; and the under-edge of each stratum, being the top of the next, and that being generally the best defined, is represented by the fullest part of each colour.

It is thus readily shown, that the most general course of the strata is from S. W. to N. E. and in some parts nearly north and south, whilst in the southern parts of the kingdom, many of their terminations have a contrary direction.

The

The colours, though brighter than those they represent, are in some degree assimilated to the colour of each stratum, except the chalk, which being colourless seems best represented by green, as strong colours are necessary, and there being no stratum of equal extent which required that colour.

In some cases where the strata are much alike, as the oxlytes, they are represented by light and dark yellows.

The strong blue colour represents the lias limestone, and the light blue, the blue marl which lies over it.

The light part of the black shade represents generally the strata which contain coal, more or less valuable, several beds of which are too thin for working.

The part most valuable and most worked is shewn by the greatest number of crosses which represent the sites of the collieries, and also by the darker shade.

In this mode of representing the strata by colours, various insular, or detached parts of the same colour may be observed.

Where these occur upon high ground (which will be known by attending to the ramifications of the rivers) they are intended to represent insular parts of the same stratum ; but where they occur in low ground, which seldom happens but by the side of large rivers, they are intended to represent the denuded parts of a stratum, whose regular out crop may be at a considerable distance.

Instances of the latter occur in the green representations of the chalk, in Norfolk and Suffolk ; and of the former in the yellow representations of stone-topped hills, in Gloucestershire.

The canals are added to this map for the purpose of shewing how the heavy articles of subterraneous produce may be best conveyed from their native sites in the strata

to the places of consumption. It may thus be seen what parts of the kingdom have benefitted most by canals, and where they are still wanting, and from whence the heavy articles of tonnage (which alone can render them profitable) may be the most readily obtained.

The SILVER MEDAL was this Session voted to THOMAS HOBLYN, Esq. of Sloane-Street, for introducing extensively the Importation of Cocoa Nut Oil, from the Isle of Ceylon. The following Communications were received from him, an explanatory Engraving is annexed, of his improved Apparatus for preparing it; and samples of the Oil, and Preparation from it, are preserved in the Society's Repository.

SIR,

As the advantages of the cocoa nut oil, which has been lately introduced into this country from Ceylon, in consequence of my suggestion, may not be so well known as its merits, I have sent to the Society various specimens of the oil, in its natural state, and in combination with substances now in common use, such as wax, spermaceti, &c. I have no doubt but that it may be very advantageously employed as a substitute for spermaceti oil, as it is considerably cheaper, burns with a clear bright flame, and is devoid of either smell or smoke. In using it in lamps, however, it will be necessary to render it previously liquid;

but

but its own combustion will afterwards generate a sufficient portion of heat, to allow of the capillary attraction going on without further trouble. It will be found useful also in the manufacture of soap, candles, and the finer articles of perfumery, and become, in future, a source of great revenue to the Island of Ceylon, and of great importance to this country, if its preparation be more carefully attended to in the plan I have suggested, of breaking up the nuts with edge stones, then pressing them immediately, when reduced to a pulp, and boiling and skimming the oil and placing it in close vessels, for the purpose of being conveyed to this country. This mode of proceeding will not only render it more pure, but prevent its rancidity, and considerably lessen the leakage, which takes place from using common casks.

The vessels in question, I have had made after the model of the water tanks now employed in the navy, which contain about two tons each.

I have the honor to be,

Sir,

Your most obedient servant,

THOMAS HOBLYN.

Sloane-Street, March 8, 1815.

To C. TAYLOR, M.D. Sac.

CERTIFICATE.

I do hereby certify, that under the authority vested in me by the Lords Commissioners of his Majesty's Treasury, I have disposed of one hundred casks, containing about

F 3

twenty

twenty tons of cocoa nut oil, lately imported from the Island of Ceylon, in the Emma and Monarch transports, which importation took place by way of experiment, on a suggestion from Mr. Hoblyn, the Deputy Agent for that Island; and from the experience of the manufacturers to whom the same has been sold, it will be likely to be attended with great utility and public importance.

W. HOWARD.

London, April 12, 1815.

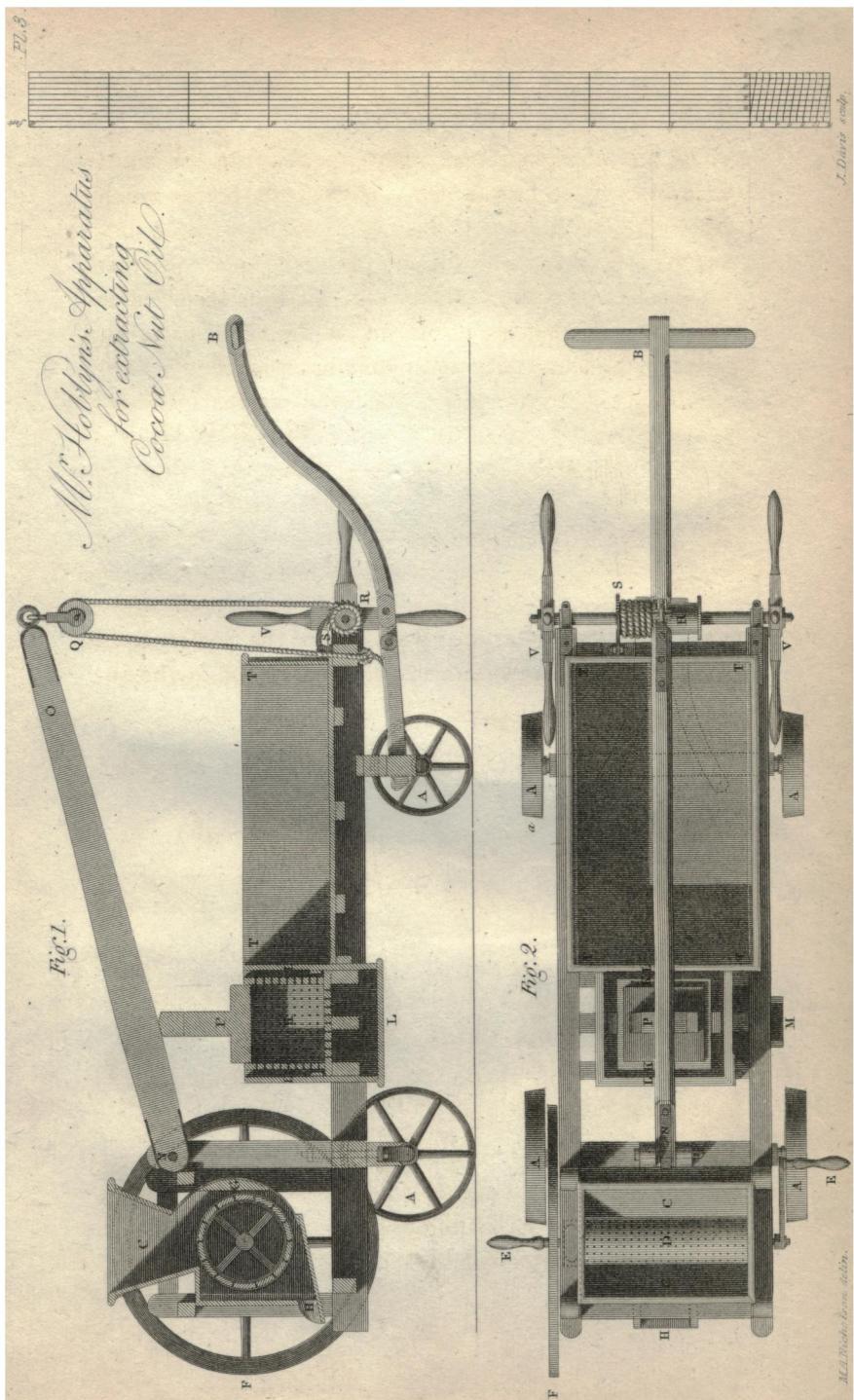
* * The following articles were sent to the Society from Mr. Hoblyn, and specimens of them placed in the Society's Repository.

No 1. Cocoa Nut Oil in its common white congealed state.

2. A composition of half oil and half spermaceti.
3. A composition of half oil and half white wax.
4. A composition of one-third oil and two-thirds wax and spermaceti.
5. A candle formed of the last composition.
6. Cocoa nut oil soap in its crude state perfumed.
7. Cocoa nut oil soap prepared and scented.
8. A solution of cocoa nut oil soap in alcohol, useful in shaving the beard.

From further information given by Mr. Hoblyn, it appears of great consequence to government, to produce freight from the Island of Ceylon, now in their hands. That cocoa nut oil will immediately furnish them a remittance

Fig. 1.



mittance of £50,000 annually, and could be much extended. That 150 casks had been lately imported at so low a rate as to be sold by Messrs. Hendrie, perfumers, in Tichbourne-street, at six shillings per gallon. Mr. Hoblyn added, that cocoa nut oil is likely to be in demand, on a very extensive scale, as he has already had an offer for 1000 tons of it.

Mr. R. Hendrie attended the Committee, and stated, that he had made three or four tons of cocoa nut oil into soap ; that it makes a sweeter and purer soap than the tallow usually employed in making soap. That soap can be made cheaper with this than olive oil, and that it will cost about ten per cent, more than tallow soap. That cocoa nut oil burns very well in the Liverpool lamps, and gives a beautiful brilliant light without smoke, and that he has reason to believe it will be very advantageous to the woollen manufactory.

*Reference to the Engraving of Mr. T. HOBLYN's Apparatus
(made under his Direction, by Mr. TIMOTHY BRAMAH,
of Pimlico) for the Extraction and Preparation of Cocoa
Nut Oil. Plate 3.*

Fig. 1. Shews a section of the machine cut through its centre.

Fig. 2. Is a plan of the whole machine.

The machine is mounted on a carriage with four wheels, AAAA.

B. The pole by which it is to be moved.

C. The hopper, which conducts the kernels to the cylinder to be ground.

F S

D

D is the cylinder, covered with plates of iron, perforated after the manner of a grater. At the ends of the axis of the cylinder are found two handles, E E, to turn the cylinder, and there is a fly-wheel, F, to regulate the motion of the cylinder.

G is a piece of wood, fixed to the back part of the hopper, so as to make an acute angle with the cylinder.

As the kernels are ground or grated by the motion of the cylinder, they are at the same time pressed down to the bottom part of the angle, which keeps them close to the cylinder, till they are all reduced to a pulp.

The pulp is convey'd to the sluice H, and then taken to the box K, for the oil to be pressed out.

K is a square box, with a great number of small holes to let the oil escape into the case L l, that surrounds the box, and conveys the oil to the sluice M, Fig. 2.

N O is a lever, moveable on a fulcrum at N, to press the mallet P into the box. At the other end of the lever is fixed a pulley Q. One end of a rope is fixed to the fore-part of a carriage; the other end goes over the sheave or block, and is made fast to the roller R. At the end of the roller is fixed a catch wheel S, with a catch to keep the rope firm. At the ends of the axis of the roller is fixed a cross V, or levers for turning the rollers. T T T T is a box, or cart, for holding the nuts, or any tools that may be required.

By Mr. Hoblyn's apparatus, three parts of the labour now employed in the manufacture of the oil may be saved, and consequently it may be afforded at a cheaper rate.

* * From

* * From subsequent experiments, it appears that the cacao nut oil soap may be used to advantage for medical and surgical purposes, in place of the foreign olive oil soaps, and that the oil is superior to tallow for use in enamellers' and jewellers' lamps.

FIVE GUINEAS were this Session voted to Mr. JOHN BAKER, of Great Wild Street, for his Method of purifying Whale Oil. The following Communication was received from him, and an Apparatus for executing the business is preserved in the Society's Repository.

SIR,

I HAVE found out a method of purifying common oil, and of making it equal to the best oil for lamps. I discovered this method in the course of last year; my master, Mr. Hoggray, No. 16, Russel Street, Covent Garden, usually burns my purified oil in an Argand's lamp, and has found it to answer perfectly in use, and the lamp will burn six hours without trimming. The expence of refining oil upon this principle is very little.

I usually purchase the unpurified oil at four shillings per gallon, and I sell it, when purified by this operation, at five shillings and sixpence per gallon.

I remain, Sir,

Your humble servant,

JOHN BAKER.

No. 25, Great Wild Street,

Dec. 14th, 1814.

To C. TAYLOR, M.D. SEC.

Mr.

Mr. JOHN BAKER's Method of purifying Whale Oil.

TAKE a garden flower-pot glazed internally and externally, and into the hole in its bottom compress a piece of clean dry sponge, so as to fit very tight in the hole, and so that part of the sponge remains above the hole, and part below it; then having placed any vessel as a receiver beneath, fill the flower-pot with the oil to be purified, it will percolate through the sponge into the lower vessel, leaving the impurities in the higher vessel, part attached to the sponge and part at its bottom. These impurities, or dregs may be scraped off the sponge with a spoon without removing the sponge, and the operation proceeded in many times before there will be a necessity to take out the sponge to be perfectly cleaned. The oil which has passed the sponge is then fit for use.

CERTIFICATES.

A CERTIFICATE was received from Mr. G. Hoggray abovementioned, stating that he had burnt Mr. Baker's purified oil the greatest part of the winter, and found a considerable advantage from its use, it burning equal to that for which he has given from six to eight shillings per gallon, and does not require so much trouble with the lamp.

ANOTHER Certificate was received from Mr. William Hawkes, No. 8, Great Wild Street, mentioning that he has burnt Mr. Baker's purified oil during the last six months,

months, and found it preferable to any he could get elsewhere.

A CERTIFICATE was also produced from Mr. A. Wylic, No. 150, Drury Lane, testifying that he has proved the burning of Mr. Baker's refined Greenland oil, and that it is much superior to the usual unrefined oils, giving a clearer light, with much smaller cotton, and producing less smoke, and that he considers it will be a considerable saving to the consumer.

Mr. R. HENDRIE, of Tichbourne Street, who has a general knowledge of oils, and was present at the Committee to see Mr. Baker's mode of filtration, thought it new and ingenious, and likely to answer the purpose.

* * * The Society were aware that sponge had been before made use of in the purification of oils and other fluids, but after minute examination could not find any instance where the sponge has been applied in so cheap, simple, and efficacious a manner as in Mr. Baker's apparatus, nor so effectually in the purification of either oil or water.